How Crude Oil Gets Separated Into Useful Products

KS4 CHEMISTRY KS3 SCIENCE Ages 11-16 ⏰ 3 min read

What is Crude Oil?

Crude oil is a thick, dark liquid found deep underground. It formed millions of years ago from dead sea creatures and plants. Crude oil itself isn't very useful, but when we separate it, we get amazing products like **petrol**, **diesel**, **fuel oil**, and even **bitumen** (used to make roads). To get these useful products, we use a process called **fractional distillation**.

How Fractional Distillation Works

Fractional distillation separates crude oil based on how easily each part evaporates. First, the crude oil is heated to about **350°C** in a furnace. This extremely hot temperature turns most of the oil into a gas or vapour.

The hot vapour then flows into a tall column called a **fractionating column**. This column is hotter at the bottom and cooler at the top. Different parts of the oil condense (turn back into liquid) at different temperatures depending on their size.

Think of it like a multi-storey car park where cars (oil molecules) park on different levels based on their size—big cars downstairs where it's hot, small cars upstairs where it's cooler.

The Different Fractions

The smallest molecules, like **petrol**, don't condense easily and rise to the top of the column where it's coolest. Medium-sized molecules like **diesel** condense lower down. The largest, heaviest molecules like **fuel oil** and **bitumen** condense at the hot bottom of the column. Each fraction is collected at different levels and removed separately.

Why This Matters

Without fractional distillation, we couldn't use crude oil effectively. The process lets us extract exactly what we need for different purposes. Petrol powers cars, diesel fuels

lorries and ships, and bitumen builds our roads. Understanding this process helps scientists develop new energy sources and find ways to use oil more sustainably. It's chemistry solving real-world problems!